

# 2021



## Missouri Deer Season Summary & Population Status Report



Missouri Department of Conservation

Prepared by:

Deer and Wildlife Health Program Staff

Science Branch

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# Deer Program Mission and Vision

The mission of the MDC's Deer Program is to use science-based wildlife management to maintain biologically and socially balanced deer populations that provide sustainable recreation and that minimize conflicts with humans and the potential for negative impacts on ecosystem health. To put this mission into action, the Deer Program is guided by four management goals:

**Goal 1: Deer Population Management** – Proactively manage deer populations for a balanced sex and age structure while maintaining densities at or below the biological and social carrying capacity within the defined management units using science-based wildlife management practices.

**Goal 2: Hunting and Recreation** – Provide opportunities for all citizens to enjoy deer and related recreational activities and promote hunting as a socially and culturally important tradition which is the primary tool for achieving deer population goals.

**Goal 3: Health and Disease Management** – Ensure the maintenance of healthy deer populations and minimize the threat and impacts of disease on deer populations in Missouri.

**Goal 4: Education, Communication, and Public Engagement** – Provide adequate information to the public about all aspects of deer management in Missouri and create opportunities for additional public engagement in decisions about the management of Missouri's deer resources.

The Deer Program, managed by the Science Branch within MDC, develops annual regulation recommendations based on harvest data, hunter and landowner surveys, MDC staff surveys, public comments, population simulations, and the Chronic Wasting Disease (CWD) Surveillance and Management Plan. The conservation of all of Missouri's valuable wildlife is made possible thanks to private landowners and all others supporting the one-eighth of one percent Conservation Sales Tax, permit sales, and income generated by fish and wildlife tourism.

Thank you!



## Equal Opportunity to Participate

Equal opportunity to participate in, and benefit from, programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, nationality, sex, age, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.

# 2021 Deer Season Overview

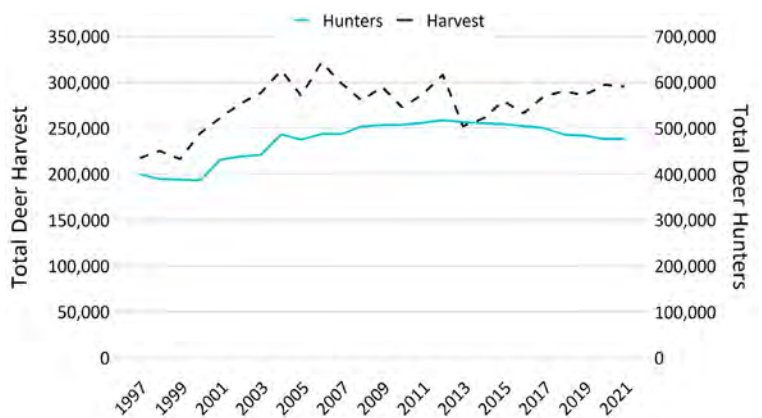
Season	Dates	What Was New for 2021?	
<b>Archery Deer and Turkey Season</b>	Sept. 15 - Nov. 12, 2021 Nov. 24, 2021 - Jan. 15, 2022	<ul style="list-style-type: none"> <li>Camden, Laclede, McDonald, and Pulaski counties were added to the CWD Management Zone.</li> <li>During Nov. 13-14, hunters who harvested a deer in the CWD Management Zone must have taken it (or the head) on the day of harvest to a CWD sampling station.</li> <li>Hunters could transport deer heads out of the CWD Management Zone and deliver them to any approved CWD sampling location within 48 hours of leaving the county of harvest, except on Nov. 13-14, when the head must have been taken to a CWD sampling station on the day of harvest.</li> <li>The antler point restriction was removed for Camden and Pulaski counties.</li> <li>Hunters were able to fill additional firearms antlerless permits in 17 counties.</li> </ul>	<ul style="list-style-type: none"> <li>Hunters were able to fill one firearms antlerless permit in Reynolds and Stoddard counties.</li> <li>Qualifying landowners were able to receive two Resident Landowner Firearms Antlerless Deer Hunting Permits in Dent, Douglas, Maries, Phelps, Texas, and Wright counties.</li> <li>The antlerless portion of firearms deer season was extended from three days to nine days.</li> <li>New managed deer hunts were added, and others were removed or modified.</li> <li>Hunters without hunter education were able to participate in most managed deer hunts, but they were required to hunt in the immediate presence of a properly licensed adult hunter who was hunter-education certified or exempt.</li> <li>Deer hunting regulations were changed for some conservation areas.</li> </ul>
<b>Firearms Deer Early Youth Portion</b>	Oct. 30-31, 2021		
<b>Firearms Deer November Portion</b>	Nov. 13-23, 2021		
<b>Firearms Deer Late Youth Portion</b>	Nov. 26-28, 2021		
<b>Firearms Deer Antlerless Portion</b>	Dec. 4-12, 2021		
<b>Firearms Deer Alternative Methods Portion</b>	Dec. 25, 2021 - Jan. 4, 2022		

Total deer harvest during the 2021 deer season (295,143) was 1% lower than the 2020 harvest total (**Table 1**). Compared to the 2020 deer season, antlered buck harvest was up 2% and was the highest on record. Doe harvest was down 2% and harvest of button bucks was down 7% during the 2021 deer season (**Table 4**). Firearms deer harvest (233,325) was 2% higher than during 2020. The archery deer harvest (59,498) was 12% lower than 2020. Harvest during the November portion of firearms deer season (188,928) was 6% higher than in 2020. The early youth portion harvest total (15,806) was down slightly (less than 1%) from 2020, and the late youth portion total (3,534) was down 11% from last year. Harvest during the alternative methods portion (10,038) was down 31% from last year, and harvest during the antlerless portion (15,019) was down 4% from 2020 (**Table 4**).

Considerably better weather during opening weekend of the November portion contributed to the harvest increase during this portion. December was one of the warmest on record, contributing to the lower harvest during the later portions of firearms deer season. Additionally, the opener of the alternative methods portion fell on Christmas day last year, which resulted in a low harvest total for that day – one of only two Saturdays that occur during this portion. Mild conditions also contributed to an antlerless portion harvest total that was down from the previous season. Although harvest during the antlerless portion was down 4% in 2021, it was up nearly 60% from the previous five-year average owing mostly to the extension of this portion from three to nine days in 2021. Although the 2021 archery season harvest was below the record set during the 2020 season, it was the third highest on record.

**Table 1. Total 2021 harvest by region compared to 2020, the 5-year average, and the 10-year average.**

Region	Total Harvest	Difference from 2020	Difference from 5-Yr Avg.	Difference from 10-Yr. Avg.
<b>Central</b>	46,634	4%	2%	6%
<b>Kansas City</b>	31,327	0%	8%	13%
<b>Northeast</b>	39,464	-5%	-2%	-2%
<b>Northwest</b>	32,513	3%	7%	6%
<b>Ozark</b>	41,959	2%	0%	3%
<b>Southeast</b>	30,874	-12%	-6%	1%
<b>Southwest</b>	42,151	-4%	0%	4%
<b>St. Louis</b>	30,221	8%	6%	13%
<b>Statewide</b>	295,143	-1%	2%	6%



**Figure 1. Trends in total deer harvest and total deer hunters in Missouri, 1997–2021.**

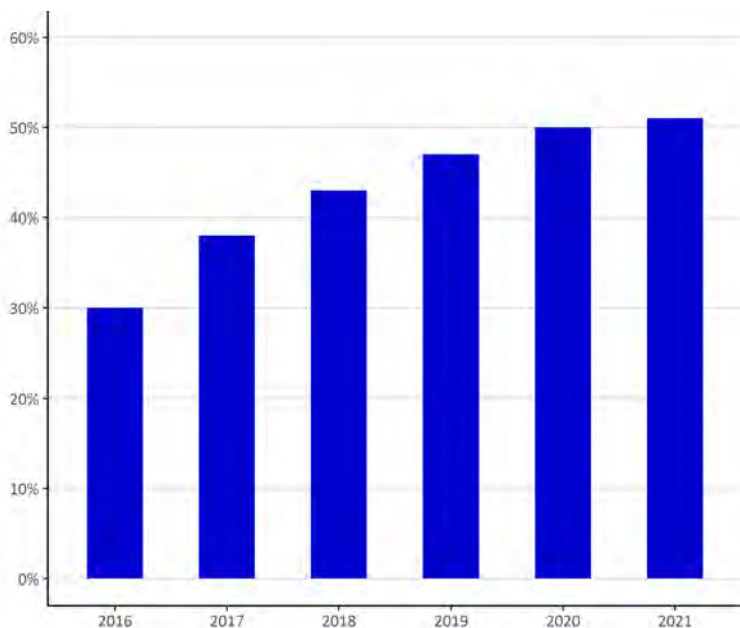
# 2021 Deer Season Summary

Deer populations across much of Missouri are currently at desired levels; however, many counties have steadily increasing deer numbers. Therefore, statewide deer management goals are largely focused on stabilizing deer numbers through increased antlerless harvest to prevent deer populations from becoming undesirably high. Statewide deer management also continues to be focused on minimizing the impacts of chronic wasting disease (CWD). Surveillance for CWD is ongoing across the state to detect new areas of infection as early as possible. Where CWD is known to occur, harvest opportunities are liberalized to maintain stable deer numbers and to remove additional infected animals. These measures help limit additional disease spread to healthy animals and new locations.

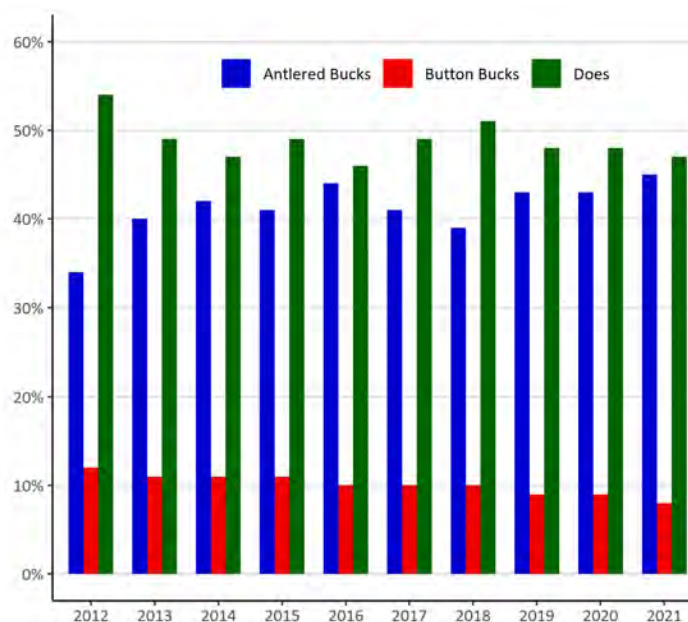
## Archery Deer Season

For nearly a decade leading up to 2019, the archery harvest trend had remained relatively stable. However, during the last three years, the average archery deer harvest has increased considerably (**Table 2**). Part of the increase is due to increased archery hunting participation as more and more hunters take advantage of the additional hunting opportunity that the archery season provides. Additionally, the large increase in harvest in 2019 was due to the calendar shift which resulted in the November portion of firearms deer season starting that year about a week later than it did in 2018. As such, archery hunters had several more days to hunt during the peak of the rut before the November portion began. We may see a slight decrease in archery season harvest over the next couple of years as the opening day of the November portion of firearms deer season shifts incrementally earlier.

The 2021 archery deer season marked the sixth year of crossbows being a legal method for all archery hunters in Missouri. MDC began allowing crossbows during the archery season in 2016 to increase hunter participation. Over the long-term, MDC hopes that allowing crossbows will recruit more youth and adult hunters into archery hunting, retain aging or hunters with disabilities that may not be able to draw vertical bows, and reactivate hunters that have previously participated in the archery season. During the 2021 archery season, 51% of the deer harvested were taken with crossbows. The percentage of the archery harvest comprised of deer harvested with crossbows has increased each year since 2016 (**Figure 2**). Allowing crossbows during the archery season has not affected the statewide composition of the archery harvest greatly. During the five years prior to allowing crossbows (2011-2015), the average percentage of antlered bucks, button bucks, and does in the archery harvest was 38%, 12%, and 51%, respectively. From 2016-2021, these averages were fairly similar (42%, 10%, and 48%, respectively) (**Figure 3**).

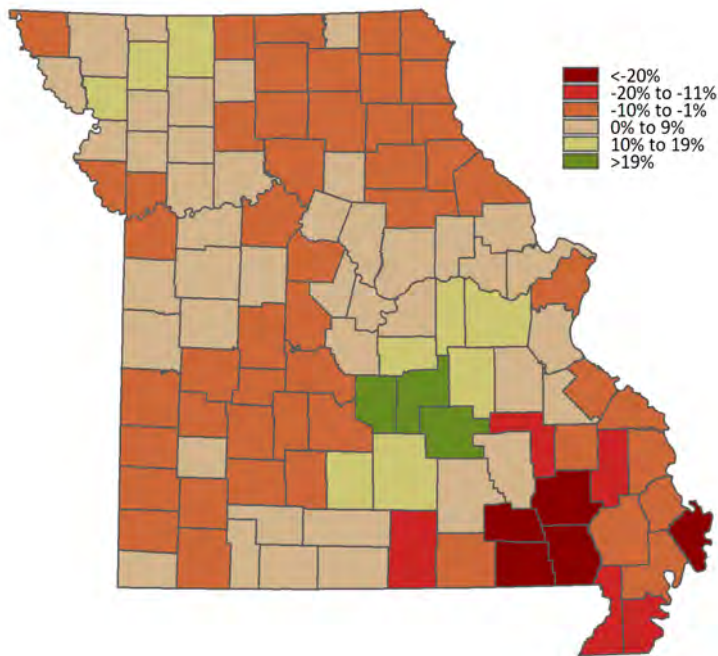


**Figure 2.** Percentage of the Missouri archery season harvest comprised of deer harvested using a crossbow, 2016-2021. Crossbows became a legal method for all archery hunters to use starting in 2016.

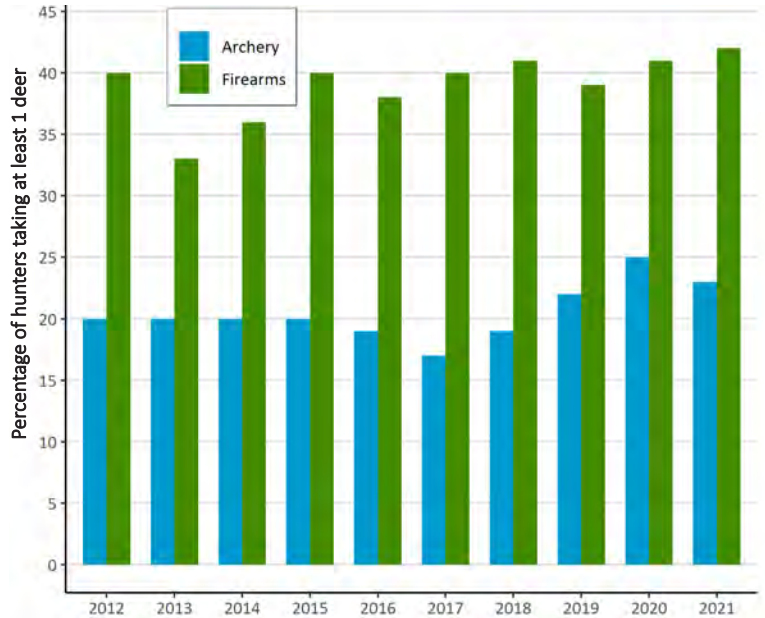


**Figure 3.** Percentage of antlered bucks, button bucks, and does in the archery season harvest in Missouri, 2012-2021.





**Figure 4.** Percent change in total deer harvest by county in 2021 compared to the 2020 deer season.



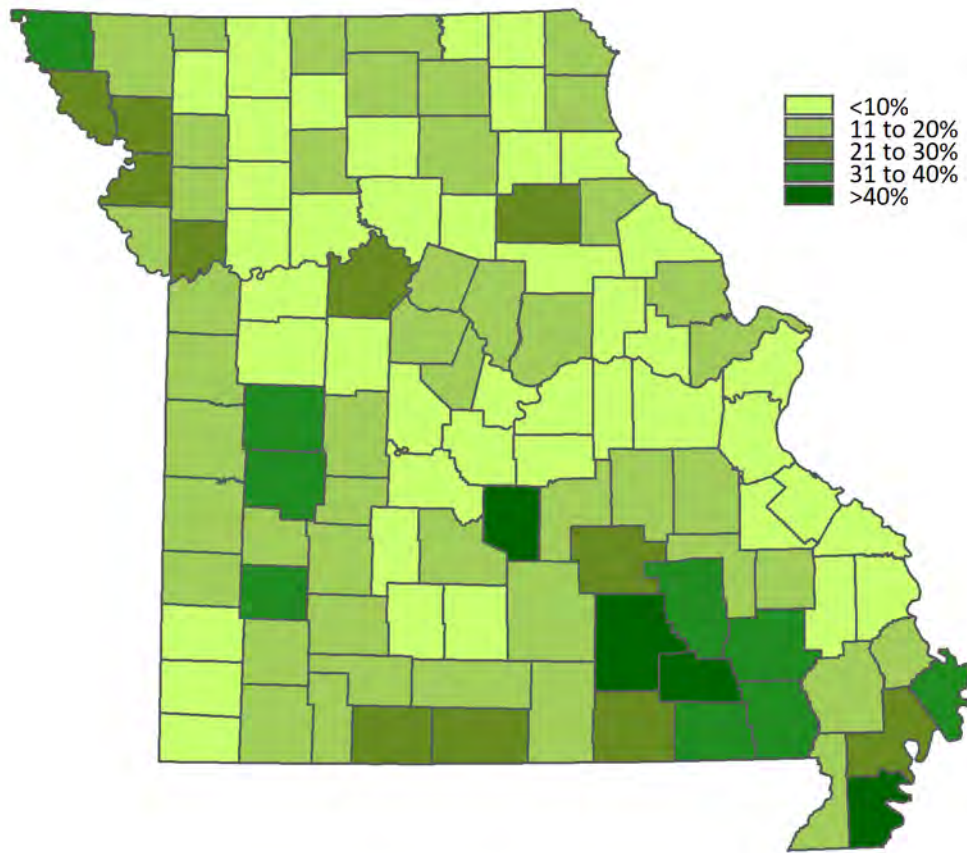
**Figure 5.** Success rates of firearms and archery deer hunters in Missouri, 2012-2021.

**Table 2.** Annual deer harvest summary by hunter residency, deer type, and hunting method, 2006-2021.

Year	Residency <sup>1</sup>		Deer Type			Method <sup>2</sup>		Total
	Resident	Non-Resident	Antlered Bucks	Button Bucks	Does	Archery	Firearm	
2006	308,103	17,167	125,193	47,372	152,982	41,942	281,011	325,457
2007	285,333	17,207	121,059	41,748	139,931	39,698	260,556	302,738
2008	266,599	17,106	100,682	40,574	142,737	42,914	239,094	283,993
2009	284,956	13,836	107,931	43,441	147,687	49,614	247,633	299,059
2010	261,134	14,290	104,794	38,473	132,426	42,467	231,466	275,693
2011	274,695	15,103	114,607	39,697	135,830	49,594	238,700	290,134
2012	293,825	15,713	120,491	42,155	147,214	51,122	256,927	309,860
2013	238,084	13,800	104,853	31,002	116,149	50,140	200,114	252,004
2014	242,020	14,930	114,409	29,943	112,720	48,566	206,885	257,072
2015	264,230	15,430	125,248	32,362	122,294	50,242	228,194	279,904
2016	249,399	16,542	128,311	28,016	110,267	47,734	217,508	266,594
2017	265,682	18,504	136,127	30,602	117,747	51,991	231,124	284,476
2018	269,948	20,119	136,849	30,115	123,260	52,915	235,732	290,224
2019	265,637	20,088	134,092	27,970	123,811	61,407	222,820	285,873
2020	274,746	22,333	140,855	28,652	127,707	67,487	227,833	297,214
2021	270,765	24,240	143,815	26,750	124,578	59,498	233,325	295,143

<sup>1</sup>Does not include harvests where residency specifications were not available.

<sup>2</sup>Does not include deer harvested during managed hunts.



**Figure 6.** Percentage of deer harvest on public land during the 2021 hunting season.

**Table 3.** Deer observations during the 2021 deer season by archery hunters participating in MDC's bowhunter observation survey.

2021 Bowhunter Observation Survey Data								
Region	Hours Hunted	Bucks Seen	Does Seen	Fawns Seen	Unknown Deer Seen	Total Deer Seen per Hour	Does per Buck	Fawns per Doe
Central	9,310	2,770	4,804	2,179	611	1.11	1.77	0.46
Kansas City	6,066	1,819	2,961	1,495	405	1.09	1.66	0.49
Northeast	10,936	3,570	5,242	2,534	709	1.14	1.48	0.47
Northwest	5,231	1,778	2,835	1,036	353	1.07	1.70	0.37
Ozark	5,764	894	2,765	1,431	346	0.98	2.96	0.54
Southeast	6,333	1,075	2,955	873	333	0.77	3.11	0.31
Southwest	6,295	1,704	3,626	1,430	449	1.09	2.15	0.35
St. Louis	8,355	1,895	3,342	1,400	473	0.81	1.76	0.47
<b>Total/Avg.</b>	<b>58,290</b>	<b>15,505</b>	<b>28,530</b>	<b>12,378</b>	<b>3,679</b>	<b>1.01</b>	<b>2.07</b>	<b>0.43</b>

**Table 4.** Deer harvest by portion and deer type, 2020-2021.

Season Portion	Antlered Bucks			Button Bucks			Does			Total		
	2020	2021	Change	2020	2021	Change	2020	2021	Change	2020	2021	Change
Archery	28,891	26,644	-8%	6,073	5,010	-18%	32,523	27,844	-14%	67,487	59,498	-12%
Managed Hunts	545	592	9%	253	338	34%	1,096	1,390	27%	1,894	2,320	22%
Early Youth	9,786	10,192	4%	1,381	1,162	-16%	4,687	4,452	-5%	15,854	15,806	0%
Late Youth	1,467	1,498	2%	524	390	-26%	1,976	1,646	-17%	3,967	3,534	-11%
November	96,298	102,054	6%	16,128	16,537	3%	65,343	70,337	8%	177,769	188,928	6%
Alternative Methods	3,811	2,760	-28%	1,834	1,135	-38%	8,978	6,143	-32%	14,623	10,038	-31%
Antlerless <sup>1</sup>	57	75	32%	2,459	2,178	-11%	13,104	12,766	-3%	15,620	15,019	-4%
<b>Total</b>	<b>140,855</b>	<b>143,815</b>	<b>2%</b>	<b>28,652</b>	<b>26,750</b>	<b>-7%</b>	<b>127,707</b>	<b>124,578</b>	<b>-2%</b>	<b>297,214</b>	<b>295,143</b>	<b>-1%</b>

<sup>1</sup>Antlered bucks taken during this portion had antlers < 3" long.

**Table 5.** Permits issued and deer harvested by permit type, 2020-2021.

Permit Type <sup>1</sup>	Number of Permits			Number of Deer Harvested		
	2020	2021	Change	2020	2021	Change
Archery Any-Deer	146,030	142,901	-2%	34,932	31,247	-11%
Landowner Archery Any-Deer	53,324	52,482	-2%	4,255	3,885	-9%
Youth Archery Any-Deer	11,078	10,688	-4%	2,119	1,736	-18%
Archery Antlerless	80,986	78,113	-4%	20,458	17,634	-14%
Landowner Archery Antlerless	104,840	102,560	-2%	4,695	4,020	-14%
Youth Archery Antlerless	5,576	5,548	-1%	985	896	-9%
Firearms Any-Deer	313,788	316,564	1%	92,541	95,236	3%
Landowner Firearms Any-Deer	83,158	82,484	-1%	20,852	20,929	0%
Youth Firearms Any-Deer	58,956	58,402	-1%	22,703	22,491	-1%
Firearms Antlerless	218,123	228,867	5%	65,629	68,342	4%
Landowner Firearms Antlerless	93,869	97,766	4%	14,968	14,664	-2%
Youth Firearms Antlerless	30,736	32,314	5%	9,390	9,459	1%
<b>Resident Firearms</b>	<b>763,191</b>	<b>777,435</b>	<b>2%</b>	<b>211,167</b>	<b>214,533</b>	<b>2%</b>
<b>Nonresident Firearms</b>	<b>35,439</b>	<b>38,962</b>	<b>10%</b>	<b>14,916</b>	<b>16,588</b>	<b>11%</b>
<b>Resident Archery</b>	<b>382,367</b>	<b>370,835</b>	<b>-3%</b>	<b>60,786</b>	<b>52,535</b>	<b>-14%</b>
<b>Nonresident Archery</b>	<b>19,467</b>	<b>21,457</b>	<b>10%</b>	<b>6,658</b>	<b>6,883</b>	<b>3%</b>

<sup>1</sup>This table is not an inclusive list of permit types.



**Table 6.** Deer hunter and harvest statistics, 2021.

	Archery	Firearms	Archery & Firearms
Age Distribution of Hunters	Number of Hunters		Number of Hunters <sup>1</sup>
10 or younger	3,288	21,510	21,919
11-15	10,861	42,556	43,570
16-40	83,543	165,599	181,608
41 or older	105,034	215,325	228,175
Total Hunters	202,726	444,990	475,272
Any-Deer Permits Issued	Number of Hunters		Number of Hunters <sup>1</sup>
Resident	137,148	349,442	368,816
Nonresident	16,441	25,524	37,420
Landowner	52,482	82,484	82,926
Antlerless Permit Sales <sup>2</sup>	Number of Hunters		Number of Hunters <sup>3</sup>
1	49,202	170,568	154,317
2	10,219	35,808	53,897
3	2,280	3,666	12,615
4 or more	1,473	1,790	9,376
Deer Harvested	Number of Hunters		Number of Hunters <sup>4</sup>
0	156,993	259,197	265,477
1	36,102	146,668	151,756
2	7,149	32,353	42,162
3	1,645	5,772	10,842
4 or more	837	1,000	5,035
Antlered Bucks Harvest <sup>5</sup>	Number of Hunters		Number of Hunters <sup>4</sup>
0	176,773	329,313	341,430
1	25,322	114,935	125,003
2	631	742	8,839
Deer Harvested	Percent of Hunters		Percent of Hunters <sup>4</sup>
0	77.4%	58.3%	55.9%
1	17.8%	33.0%	31.9%
2	3.5%	7.3%	8.9%
3 or more	1.2%	1.5%	3.3%
Antlered Bucks Harvested <sup>5</sup>	Percent of Hunters		Percent of Hunters <sup>4</sup>
0	87.2%	74.0%	71.8%
1	12.5%	25.8%	26.3%
2	0.3%	0.2%	1.9%

<sup>1</sup>Number of individuals that held an archery and/or firearms any-deer permit.

<sup>2</sup>Excludes no-cost landowner permits.

<sup>3</sup>Number of hunters that purchased the specified number of permits when combining their archery and firearms permits.

<sup>4</sup>Number/percent of hunters that harvested the specified number when combining their archery and firearms harvest.

<sup>5</sup>Includes hunters that harvested antlered bucks during managed hunts.

# Regional Deer Population Status

Statewide deer population trends are important; however, regional trends are more informative to most landowners and hunters. It is also important to recognize that deer populations can vary considerably within a region and even within a county. Regional and local diversity in deer numbers can be a result of differences in land cover and use, harvest regulations, hunter goals and density, and disease events. Therefore, regional information should be considered as a starting point when evaluating deer populations within a localized area.



## Regional Offices

### Central Region

3500 East Gans Road  
Columbia, MO 65201  
573-815-7900

### Kansas City Region

12405 SE Ranson Road  
Lee's Summit, MO 64082  
816-622-0900

### Northwest Region

701 James McCarthy Drive  
St. Joseph, MO 64507  
816-271-3100

### Ozark Region

551 Joe Jones Blvd.  
West Plains, MO 65775  
417-256-7161

### Southeast Region

2302 County Park Drive  
Cape Girardeau, MO 63701  
573-290-5730

### Northeast Region

3500 S. Baltimore  
Kirksville, MO 63501  
660-785-2420

### Southwest Region

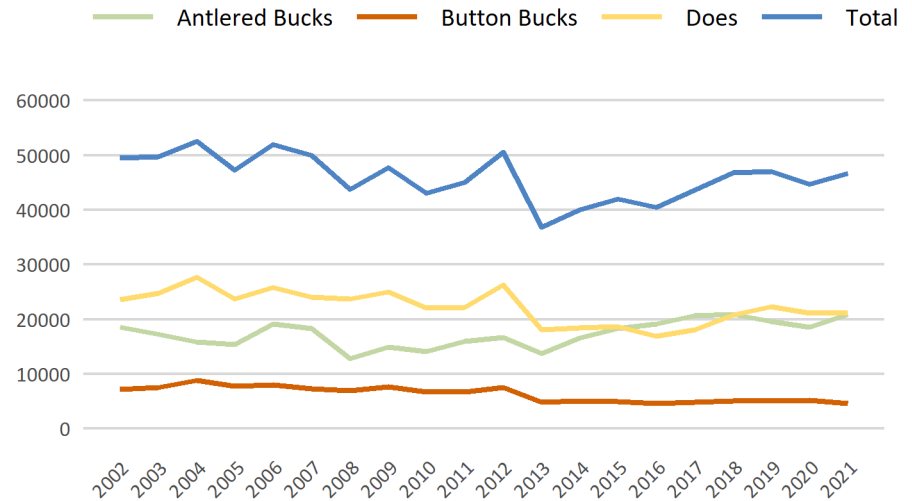
2630 N. Mayfair  
Springfield, MO 65803  
417-895-6880

### St. Louis Region

2360 Highway D  
St. Charles, MO 63304  
636-441-4554

# Central Region Deer Summary

In 2021, the Central Region had the highest regional deer harvest with a total of 46,634 deer which was 4% higher than in 2020 (**Table 7, Figure 7**). In 2021, the Central Region ranked 2nd among regions for the number of deer harvested per square mile at 5.6. Top harvest counties within the region were Callaway, Osage, and Morgan. The deer population across most of the Central Region has fully recovered from a low point in 2013 following a particularly severe outbreak of hemorrhagic disease in 2012.



**Figure 7.** Central Region harvest trend, 2002-2021.

**Table 7.** Central Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Audrain	2,173	3.3	4.6	6.6	1.7	36.6
Boone	3,303	5.4	11.1	7.7	5.7	29.2
Callaway	5,458	7.0	9.9	7.9	4.1	27.3
Camden	3,657	6.0	9.6	8.5	3.6	34.6
Cole	1,833	5.3	9.7	11.8	3.9	22.6
Cooper	2,209	4.1	6.2	7.5	2.3	33.2
Gasconade	3,790	7.6	14.5	9.8	4.0	24.5
Howard	2,484	5.7	8.8	6.2	2.8	28.5
Maries	2,509	4.9	8.3	9.3	1.8	21.7
Miller	3,277	5.8	7.9	6.8	1.9	21.2
Moniteau	1,807	4.5	6.3	6.7	2.0	18.2
Montgomery	3,398	6.7	11.5	7.7	3.5	29.0
Morgan	4,349	7.6	8.8	7.4	3.2	21.0
Osage	4,361	7.5	12.9	8.3	3.4	22.2
Saline	2,026	2.9	5.0	8.9	1.6	32.1
<b>Total (t)/Avg (a)</b>	<b>t = 46,634</b>	<b>a = 5.6</b>	<b>a = 9.0</b>	<b>a = 8.1</b>	<b>a = 3.0</b>	<b>a = 26.8</b>



# Kansas City Region Deer Summary

Total harvest for the Kansas City Region in 2021 was 31,327 which was similar to 2020 (Table 8, Figure 8). The deer harvest in Kansas City Region ranked 6th among regions and 6th for the number of deer harvested per square mile at 4.4. Top harvest counties within the region were Benton, St. Clair, and Henry. The deer population across much of the region continues to increase from a low point in 2013 following a particularly severe outbreak of hemorrhagic disease in 2012.

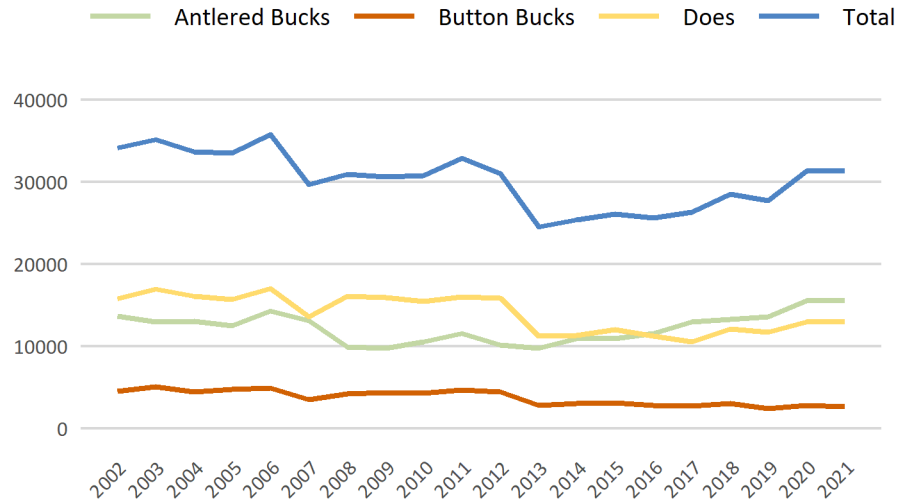


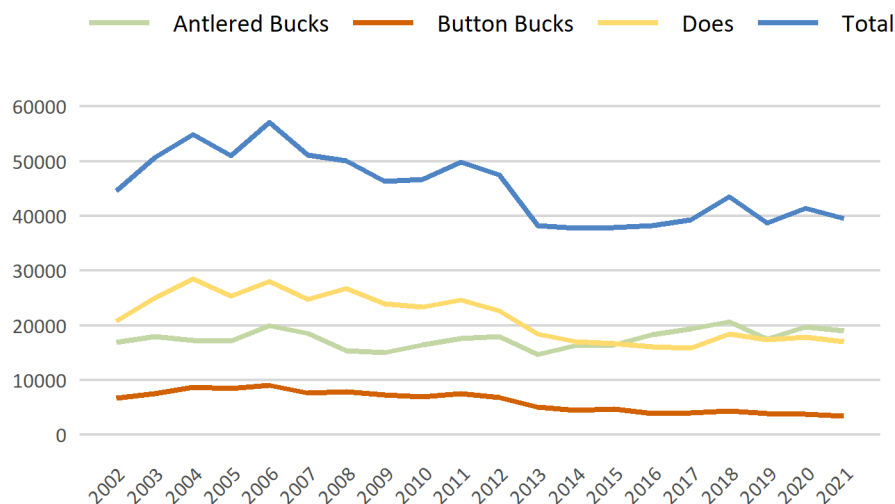
Figure 8. Kansas City Region harvest trend, 2002-2021.

Table 8. Kansas City Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Bates	2,189	2.8	4.9	8.0	1.8	32.0
Benton	4,799	7.2	10.7	8.1	3.4	29.7
Cass	2,495	4.0	7.1	8.5	3.1	28.8
Clay	1,082	3.6	5.7	7.4	5.1	26.5
Henry	3,534	5.8	9.8	8.7	3.4	20.2
Jackson	1,858	4.9	6.4	9.2	6.5	24.8
Johnson	3,140	4.1	6.3	6.8	1.9	32.1
Lafayette	1,528	2.6	4.9	10.9	1.4	28.0
Pettis	2,894	4.5	5.6	8.0	2.0	25.2
Platte	1,073	3.0	5.2	8.4	3.7	25.7
St. Clair	3,757	5.9	9.0	7.6	2.7	22.5
Vernon	2,978	4.2	5.3	8.3	2.2	25.4
<b>Total (t)/Avg (a)</b>	<b>t = 31,327</b>	<b>a = 4.4</b>	<b>a = 6.7</b>	<b>a = 8.3</b>	<b>a = 3.1</b>	<b>a = 26.7</b>

# Northeast Region Deer Summary

Total harvest for the Northeast Region in 2021 was 39,464, which was 5% lower than in 2020 (**Table 9, Figure 9**). The deer harvest ranked 4th among the other regions, and the Northeast Region ranked 3rd for the number of deer harvested per square mile at 5.3. Top harvest counties were Macon, Pike, and Monroe. Following a considerable decline in deer numbers caused by a severe hemorrhagic disease outbreak in 2012, deer numbers in the Northeast Region have been slowly rebounding.



**Figure 9.** Northeast Region harvest trend, 2002-2021.

**Table 9.** Northeast Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Adair	2,566	4.9	9.0	10.2	3.2	22.7
Clark	2,259	4.8	6.7	8.2	3.0	22.0
Knox	2,164	4.6	7.2	6.6	2.8	27.8
Lewis	2,063	4.4	6.9	7.2	2.5	19.8
Macon	4,098	5.5	8.2	7.7	3.4	33.5
Marion	2,111	5.2	8.8	7.7	3.4	28.4
Monroe	3,539	5.8	9.4	7.6	3.6	29.9
Pike	4,026	6.5	10.1	7.5	4.0	27.2
Putnam	2,603	5.4	7.4	7.9	3.2	14.8
Ralls	2,398	5.4	9.6	7.0	3.2	28.0
Randolph	2,673	6.0	9.4	6.9	2.7	30.5
Schuyler	1,571	5.4	6.7	5.5	2.9	11.8
Scotland	2,497	6.0	7.6	7.3	3.2	20.3
Shelby	2,410	5.1	7.9	6.6	3.3	18.2
Sullivan	2,486	4.1	6.3	7.0	2.7	22.5
<b>Total (t)/Avg (a)</b>	<b>t = 39,464</b>	<b>a = 5.3</b>	<b>a = 8.1</b>	<b>a = 7.4</b>	<b>a = 3.1</b>	<b>a = 23.8</b>

# Northwest Region Deer Summary

In 2021, total deer harvest for the Northwest Region was 32,513, which was 3% higher than the 2020 harvest total (Table 10, Figure 10). The Northwest Region ranked 5th in total deer harvest and 8th in deer harvested per square mile at 3.5. Top harvest counties were Harrison, Linn, and Daviess. Over the past 15 years, deer population estimates and harvest in the Northwest Region have declined more sharply than any other region. These declines are attributed to habitat loss through conversion of grassland to row-crop agriculture, as well as a particularly severe hemorrhagic disease outbreak in 2012. Conservative harvest regulations have allowed the population to rebound somewhat in recent years.

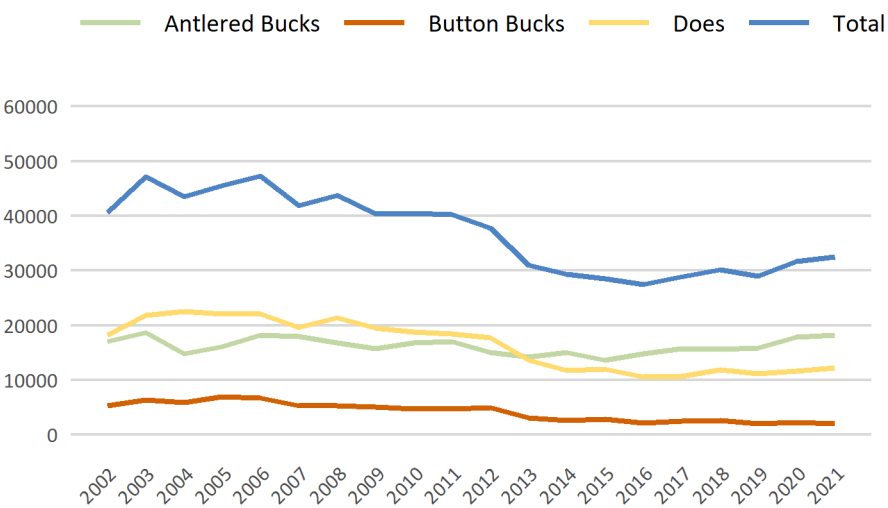


Figure 10. Northwest Region harvest trend, 2002-2021.

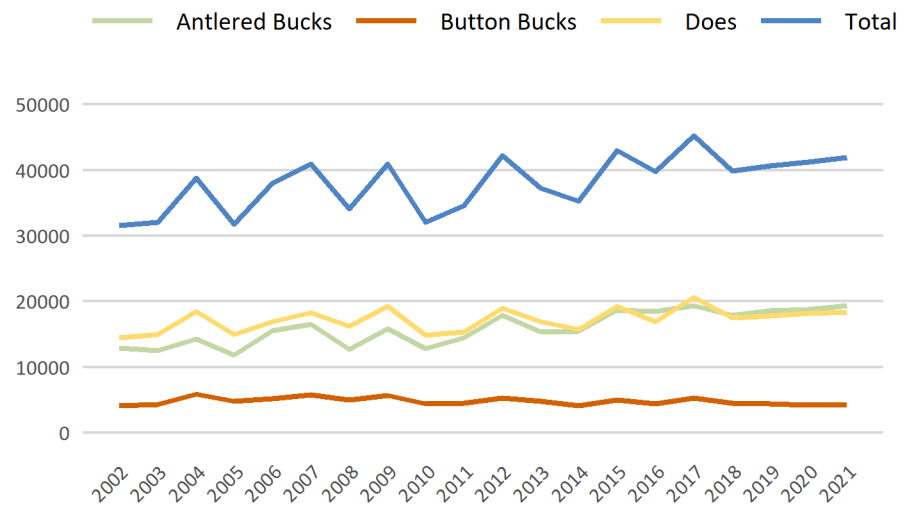
Table 10. Northwest Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Andrew	1,156	2.9	5.9	9.3	2.6	53.8
Atchison	549	1.0	2.5	9.7	1.2	23.8
Buchanan	807	2.3	5.8	12.7	2.8	52.8
Caldwell	1,724	4.3	9.4	6.6	2.3	25.8
Carroll	2,404	3.7	5.0	6.4	1.8	18.6
Chariton	2,036	3.1	5.4	8.5	1.7	28.2
Clinton	892	2.3	5.7	13.1	2.7	51.9
Daviess	2,711	5.1	6.4	7.0	2.6	29.3
DeKalb	988	2.5	6.4	8.5	2.2	36.3
Gentry	1,611	3.4	6.3	7.4	2.3	27.6
Grundy	1,880	4.7	6.3	6.1	2.3	25.9
Harrison	3,414	5.0	6.9	6.6	2.8	23.6
Holt	919	2.2	4.7	7.9	1.6	29.5
Linn	2,937	5.2	6.9	6.9	3.1	23.2
Livingston	1,977	4.1	6.1	7.1	1.7	50.9
Mercer	2,093	4.9	6.2	6.7	2.3	23.3
Nodaway	1,678	2.0	3.6	9.6	1.0	37.2
Ray	1,567	3.0	5.9	9.5	1.9	39.7
Worth	1,170	4.6	6.5	6.8	3.2	13.3
Total (t)/Avg (a)	t = 32,513	a = 3.5	a = 5.9	a = 8.2	a = 2.2	a = 32.4



# Ozark Region Deer Summary

Total deer harvest in the Ozark Region in 2021 was 41,959, which was 2% higher than in 2020 (**Table 11, Figure 11**). The Ozark Region ranked 3rd in total harvest and 4th in harvest per square mile at 4.7. Top harvest counties were Texas, Howell, and Dent. The deer population in the Ozark Region has been increasing steadily, as has been the case across much of southern Missouri, due to historically conservative harvest regulations.



**Figure 11.** Ozark Region harvest trend, 2002-2021.

**Table 11.** Ozark Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Carter	1,795	3.6	9.4	13.8	2.0	18.8
Dent	4,186	5.7	7.8	8.3	1.7	38.7
Douglas	3,496	4.4	5.4	7.5	1.6	26.4
Howell	4,794	5.4	5.6	7.6	1.3	25.0
Oregon	3,905	5.0	5.2	6.6	1.8	18.1
Ozark	2,728	3.8	5.2	8.5	1.4	28.5
Phelps	2,939	4.6	9.0	10.0	2.6	23.9
Pulaski	2,774	5.4	9.1	8.6	4.0	41.9
Ripley	2,875	4.8	7.3	10.5	1.5	35.5
Shannon	3,362	3.4	4.5	9.8	1.0	16.7
Texas	5,482	4.8	6.3	8.4	1.5	33.1
Wright	3,623	5.5	7.5	6.2	1.7	12.4
<b>Total (t)/Avg (a)</b>	<b>t = 41,959</b>	<b>a = 4.7</b>	<b>a = 6.9</b>	<b>a = 8.8</b>	<b>a = 1.8</b>	<b>a = 26.6</b>

# Southeast Region Deer Summary

The total deer harvest within the Southeast Region in 2021 was 30,874, which was 12% lower than in 2020 (Table 12, Figure 12). Among regions, Southeast ranked 7th in total deer harvest and 7th in harvest per square mile at 3.5. Top harvest counties were Bollinger, Reynolds, and Wayne. The region has some of the most diverse habitat in the state causing the deer population and harvest to vary dramatically across the region. Like much of southern Missouri, the deer population in the Southeast Region has been growing steadily for many years.

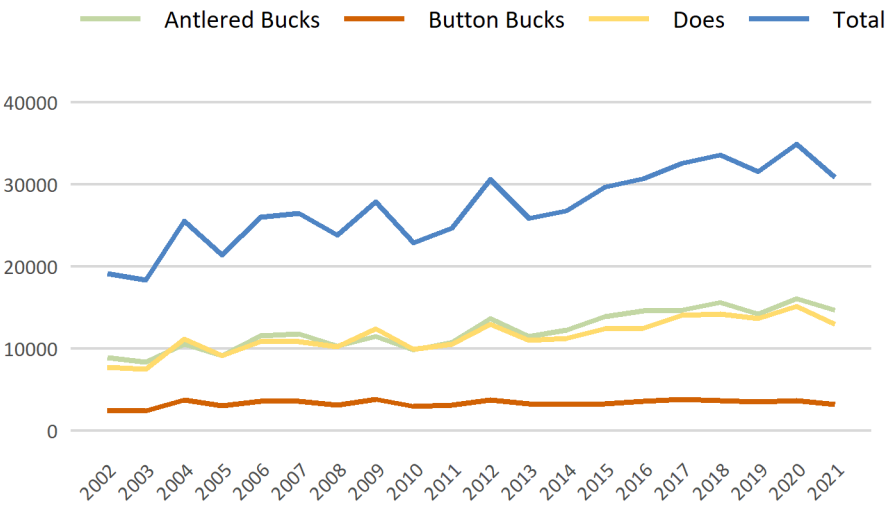


Figure 12. Southeast Region harvest trend, 2002-2021.

Table 12. Southeast Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Bollinger	3,983	6.7	12.8	9.5	3.9	23.9
Butler	1,383	2.2	5.8	13.2	1.9	31.4
Cape Girardeau	2,689	5.0	9.3	9.6	3.9	32.1
Dunklin	415	0.8	1.4	6.5	0.9	34.1
Iron	1,533	2.9	5.8	11.7	1.6	34.2
Madison	2,681	5.6	9.9	8.9	2.7	25.6
Mississippi	214	0.6	1.6	6.9	0.6	64.0
New Madrid	310	0.5	2.0	16.1	0.6	54.4
Pemiscot	149	0.3	0.9	28.1	0.6	25.1
Perry	2,888	6.4	11.3	8.7	2.9	46.4
Reynolds	3,282	4.2	5.7	7.4	1.8	14.6
St. Francois	2,828	7.0	10.8	8.3	3.9	22.4
Ste. Genevieve	2,621	5.5	12.9	11.6	3.4	40.2
Scott	695	1.8	4.4	10.7	1.3	12.7
Stoddard	2,150	2.8	4.0	10.2	2.0	33.9
Wayne	3,053	4.3	9.1	12.4	3.0	33.9
Total (t)/Avg (a)	t = 30,874	a = 3.5	a = 6.7	a = 11.2	a = 2.2	a = 33.1

# Southwest Region Deer Summary

During the 2021 hunting season, 42,151 deer were harvested in the Southwest Region. This total was 4% lower than the 2020 harvest (**Table 13, Figure 13**). Regional deer harvest ranked 2nd among regions, and the number of deer harvested per square mile ranked 5th at 4.5. Top harvest counties were Dallas, Laclede, and Webster. The deer population has exhibited a slowly increasing trend over time, due in large part to historically conservative harvest regulations within the region.

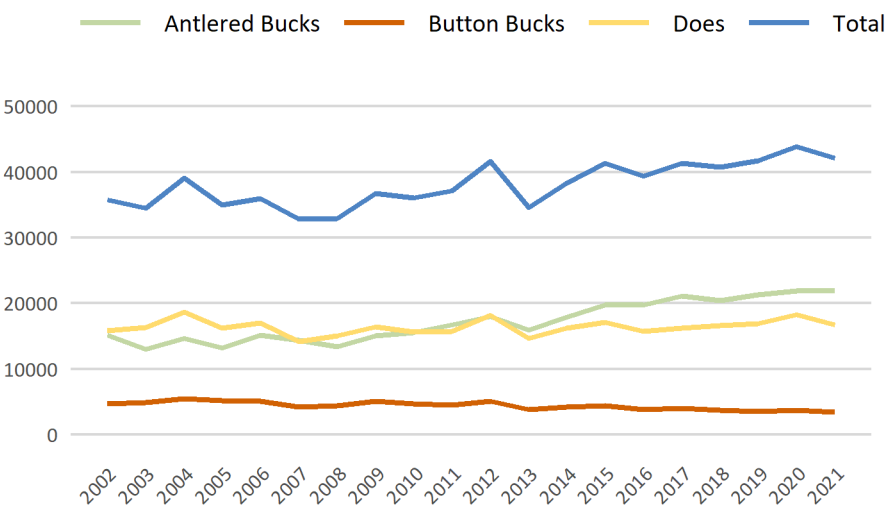


Figure 13. Southwest Region harvest trend, 2002-2021.

Table 13. Southwest Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Barry	2,053	2.7	5.8	12.6	2.1	38.1
Barton	1,911	3.5	4.5	12.1	1.9	35.3
Cedar	2,554	5.6	8.0	7.6	2.5	29.2
Christian	2,482	4.7	9.7	7.2	3.5	28.7
Dade	1,665	3.5	5.8	5.3	2.3	29.5
Dallas	3,632	6.9	9.2	7.1	2.1	18.7
Greene	3,023	5.3	10.2	8.4	5.5	32.2
Hickory	2,732	7.0	10.4	6.0	3.7	23.4
Jasper	2,430	4.4	7.2	7.6	2.7	27.9
Laclede	3,501	4.8	8.1	8.3	2.0	24.9
Lawrence	1,919	3.3	5.2	9.2	1.7	54.1
McDonald	1,616	3.1	5.0	11.7	1.6	41.6
Newton	2,444	4.2	7.1	9.3	2.4	31.7
Polk	3,050	5.0	7.1	7.5	2.7	25.4
Stone	1,808	4.2	6.9	9.9	3.1	23.3
Taney	2,214	3.9	7.5	11.1	2.4	30.3
Webster	3,117	5.5	9.1	7.7	2.5	21.3
Total (t)/Avg (a)	t = 42,151	a = 4.5	a = 7.5	a = 8.7	a = 2.6	a = 30.3



# St. Louis Region Deer Summary

A total of 30,221 deer were harvested in the St. Louis Region in 2021, which was 8% higher than the 2020 harvest (**Table 14, Figure 14**). The St. Louis Region ranked 8th in total deer harvest among other regions, but 1st in deer harvest per square mile at 6.7. Top harvest counties were Franklin, Jefferson, and Crawford. The deer population in the St. Louis Region has been increasing slowly over time.

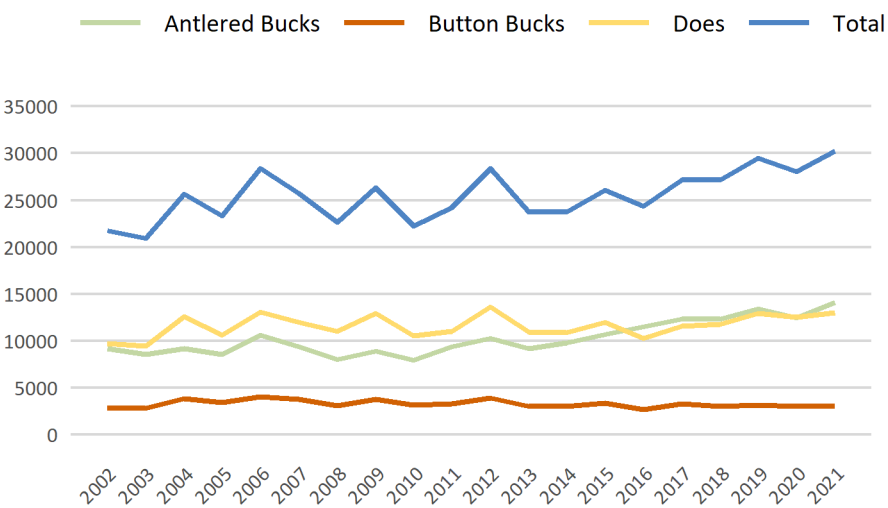


Figure 14. St. Louis Region harvest trend, 2002-2021.

Table 14. St. Louis Region harvest and hunting effort, 2021.

County	Total Harvest	Harvest per Square Mile	Firearms Hunters per Square Mile	Trips per Kill (Firearms)	Archery Hunters per Square Mile	Trips per Kill (Archery)
Crawford	4,011	5.6	9.5	8.5	2.5	28.7
Franklin	6,601	7.8	12.7	9.0	4.3	41.8
Jefferson	5,156	9.0	12.8	8.9	6.6	30.7
Lincoln	3,884	6.8	11.3	9.2	4.9	34.2
St. Charles	2,122	5.0	8.6	9.0	5.9	42.1
St. Louis	2,184	9.9	7.4	6.4	12.7	15.2
Warren	2,694	6.7	11.7	10.2	4.8	29.0
Washington	3,569	4.9	8.4	9.7	2.6	32.3
Total (t)/Avg (a)	t = 30,221	a = 6.7	a = 10.3	a = 8.9	a = 5.5	a = 31.7

# County Deer Population Status

Deer populations can be highly variable within a region and even within a county due to variation in habitat availability, harvest regulations, local hunter goals and density, amount of public and private land, and disease outbreaks (e.g., hemorrhagic disease). Therefore, county-wide assessments of deer population trends are not applicable to every local situation but are a general representation of the status and population trend.

The Deer Program evaluates a variety of data to assess county-specific deer populations and for hunting regulation development including:

- **Harvest data** — The total number and composition (antlered bucks, does, and button bucks) of harvested deer.
- **Population data** — Population simulations incorporating age-at-harvest data and estimated survival and reproduction rates.
- **Hunter, landowner, and staff surveys** — Hunters and landowners are randomly selected to receive mail surveys.
- **Public and staff input** — Input is received via email, the MDC website, public meetings, and phone calls.



Survey data is critical when assessing the deer population in relation to public acceptance levels. In cooperation with the USDA, we send out surveys statewide to agricultural producers to assess perceptions and attitudes toward deer populations and regulations. Additionally, we survey deer hunters annually to estimate hunter effort, hunter density, and opinions concerning deer populations and regulations. We also consider public comments received throughout the year via the web, letters, calls, social media, public meetings, and emails.

The Deer Program reviews this information annually on a county-by-county basis to classify the deer population status and trends. Socially acceptable levels (cultural carrying capacity) are the first thing we look at when classifying the status of the deer population. Although biological carrying capacity, or the habitat's limitations on the number of deer that can be supported, is included within our assessment, cultural carrying capacity is typically much lower. We aim for this goal because when deer populations are at biological carrying capacity, numbers are high enough to increase deer-human conflict. By monitoring population trends for each county, we can gain an understanding of population status and adjust harvest regulations accordingly.



The goal of MDC's Deer Program is to maintain stable deer populations within each county that are at a socially acceptable level for most stakeholders. Currently, deer populations are increasing across most of Missouri and are generally at socially acceptable levels. Exceptions include extreme southeastern Missouri where limited habitat availability results in low deer numbers and portions of northwestern Missouri that are still recovering from a severe outbreak of hemorrhagic disease that occurred in 2012 as well as habitat loss due to conversion of grassland to row-crop agriculture. Across most of the state, the deer population has recovered from the population decline that occurred because of the hemorrhagic disease outbreak of 2012.

**Table 15.** County deer harvest totals by method of take and deer type, 2021.

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Adair	305	33	237	575	1,057	154	779	1,990	1,363	187	1,016	2,566
Andrew	118	10	94	222	554	57	321	932	673	68	415	1,156
Atchison	82	9	53	144	313	12	80	405	395	21	133	549
Audrain	167	37	237	441	732	194	806	1,732	899	231	1,043	2,173
Barry	183	35	163	381	913	112	645	1,670	1,098	147	808	2,053
Barton	193	13	175	381	806	108	609	1,523	1,001	122	788	1,911
Bates	199	22	146	367	1,110	129	582	1,821	1,310	151	728	2,189
Benton	344	88	453	885	1,715	411	1,765	3,891	2,064	501	2,234	4,799
Bollinger	271	84	367	722	1,436	387	1,438	3,261	1,707	471	1,805	3,983
Boone	409	40	395	844	1,170	209	1,079	2,458	1,579	249	1,475	3,303
Buchanan	59	8	55	122	414	44	227	685	473	52	282	807
Butler	154	42	185	381	551	94	354	999	707	136	540	1,383
Caldwell	155	16	110	281	814	104	525	1,443	969	120	635	1,724
Callaway	452	106	561	1,119	1,800	387	1,998	4,185	2,268	523	2,667	5,458
Camden	337	81	366	784	1,475	282	1,114	2,871	1,813	363	1,481	3,657
Cape Girardeau	173	40	235	448	1,052	186	988	2,226	1,228	228	1,233	2,689
Carrol	204	24	192	420	1,119	145	718	1,982	1,324	169	911	2,404
Carter	192	66	272	530	692	102	400	1,194	910	181	704	1,795
Cass	275	28	224	527	1,096	144	725	1,965	1,372	172	951	2,495
Cedar	259	29	215	503	1,062	136	748	1,946	1,346	178	1,030	2,554
Chariton	186	18	112	316	985	96	630	1,711	1,178	114	744	2,036
Christian	257	51	256	564	1,032	159	725	1,916	1,290	210	982	2,482
Clark	330	29	206	565	829	156	706	1,691	1,160	186	913	2,259
Clay	181	20	148	349	398	39	205	642	602	73	407	1,082
Clinton	93	13	61	167	396	65	252	713	494	79	319	892
Cole	159	46	171	376	622	166	664	1,452	782	212	839	1,833
Cooper	180	27	154	361	872	164	812	1,848	1,052	191	966	2,209
Crawford	278	93	359	730	1,607	351	1,321	3,279	1,887	444	1,680	4,011
Dade	135	30	103	268	737	104	556	1,397	872	134	659	1,665
Dallas	305	72	303	680	1,502	270	1,178	2,950	1,809	342	1,481	3,632
Daviess	219	28	309	556	1,072	187	896	2,155	1,291	215	1,205	2,711
DeKalb	78	9	74	161	480	48	299	827	558	57	373	988
Dent	210	69	287	566	1,579	380	1,660	3,619	1,789	449	1,948	4,186

<sup>1</sup>Includes deer harvested during managed hunts.



**Table 15.** County deer harvest totals by method of take and deer type, 2021.

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Douglas	200	52	245	497	1,528	264	1,204	2,996	1,730	316	1,450	3,496
Dunklin	37	7	48	92	198	24	100	322	236	31	148	415
Franklin	518	135	653	1,306	2,633	527	2,131	5,291	3,153	662	2,786	6,601
Gasconade	303	70	286	659	1,581	306	1,241	3,128	1,887	376	1,527	3,790
Gentry	141	22	124	287	764	94	466	1,324	905	116	590	1,611
Greene	376	57	388	821	1,167	184	798	2,149	1,554	248	1,221	3,023
Grundy	176	21	174	371	800	108	600	1,508	976	129	775	1,880
Harrison	427	19	262	708	1,515	171	1,019	2,705	1,942	190	1,282	3,414
Henry	292	81	386	759	1,341	257	1,175	2,773	1,633	338	1,563	3,534
Hickory	219	55	257	531	1,053	230	898	2,181	1,273	290	1,169	2,732
Holt	106	8	90	204	468	32	210	710	577	40	302	919
Howard	234	23	233	490	1,023	109	827	1,959	1,258	140	1,086	2,484
Howell	337	74	360	771	1,812	435	1,772	4,019	2,152	509	2,133	4,794
Iron	137	27	131	295	785	114	339	1,238	922	141	470	1,533
Jackson	350	46	358	754	456	53	302	811	890	130	838	1,858
Jasper	341	29	237	607	1,099	110	614	1,823	1,440	139	851	2,430
Jefferson	650	157	772	1,579	1,797	351	1,425	3,573	2,449	508	2,199	5,156
Johnson	263	40	253	556	1,315	206	962	2,483	1,594	271	1,275	3,140
Knox	257	20	186	463	826	166	708	1,700	1,083	186	895	2,164
Laclede	279	69	287	635	1,526	277	1,060	2,863	1,807	346	1,348	3,501
Lafayette	96	17	122	235	674	118	501	1,293	770	135	623	1,528
Lawrence	185	45	168	398	866	132	516	1,514	1,051	180	688	1,919
Lewis	179	25	149	353	831	153	723	1,707	1,011	178	874	2,063
Lincoln	315	71	387	773	1,348	324	1,294	2,966	1,686	416	1,782	3,884
Linn	324	36	268	628	1,258	158	826	2,242	1,592	206	1,139	2,937
Livingston	185	13	185	383	904	93	597	1,594	1,089	106	782	1,977
Macon	394	51	367	812	1,746	260	1,279	3,285	2,141	311	1,646	4,098
Madison	161	55	218	434	1,077	269	901	2,247	1,238	324	1,119	2,681
Maries	187	58	197	442	936	248	879	2,063	1,124	306	1,079	2,509
Marion	192	21	207	420	773	176	742	1,691	965	197	949	2,111
McDonald	173	25	128	326	765	84	438	1,287	939	110	567	1,616

<sup>1</sup>Includes deer harvested during managed hunts.

**Table 15.** County deer harvest totals by method of take and deer type, 2021.

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Mercer	287	24	210	521	880	78	614	1,572	1,167	102	824	2,093
Miller	246	52	261	559	1,116	350	1,250	2,716	1,362	403	1,512	3,277
Mississippi	14	2	15	31	126	8	49	183	140	10	64	214
Moniteau	109	21	123	253	661	173	719	1,553	770	194	843	1,807
Monroe	297	73	306	676	1,224	320	1,297	2,841	1,524	399	1,616	3,539
Montgomery	217	65	332	614	1,188	308	1,286	2,782	1,406	373	1,619	3,398
Morgan	360	78	432	870	1,453	385	1,639	3,477	1,813	463	2,073	4,349
New Madrid	21	7	24	52	178	11	69	258	199	18	93	310
Newton	296	27	194	517	1,044	135	721	1,900	1,352	164	928	2,444
Nodaway	190	8	94	292	888	85	410	1,383	1,079	93	506	1,678
Oregon	293	65	329	687	1,427	307	1,477	3,211	1,722	373	1,810	3,905
Osage	298	68	360	726	1,471	364	1,797	3,632	1,770	433	2,158	4,361
Ozark	189	38	192	419	1,129	197	928	2,254	1,336	247	1,145	2,728
Pemiscot	16	3	18	37	68	6	38	112	84	9	56	149
Perry	116	45	194	355	1,106	248	1,178	2,532	1,222	293	1,373	2,888
Pettis	230	41	266	537	1,150	208	999	2,357	1,380	249	1,265	2,894
Phelps	193	66	285	544	1,059	264	1,071	2,394	1,253	330	1,365	2,939
Pike	289	87	420	796	1,258	378	1,585	3,221	1,548	467	2,011	4,026
Platte	173	24	163	360	432	37	243	712	606	61	406	1,073
Polk	266	39	285	590	1,271	207	980	2,458	1,537	246	1,267	3,050
Pulaski	298	63	343	704	1,034	227	809	2,070	1,332	290	1,152	2,774
Putnam	395	15	305	715	1,047	98	742	1,887	1,443	113	1,047	2,603
Ralls	183	45	248	476	827	236	859	1,922	1,010	281	1,107	2,398
Randolph	245	34	267	546	1,075	175	877	2,127	1,320	209	1,144	2,673
Ray	126	15	113	254	767	83	462	1,312	894	98	575	1,567
Reynolds	227	69	327	623	1,320	270	1,068	2,658	1,547	339	1,396	3,282
Ripley	190	59	233	482	927	301	1,165	2,393	1,117	360	1,398	2,875
St. Charles	225	57	237	519	663	100	563	1,326	992	194	936	2,122
St. Clair	300	90	354	744	1,496	273	1,241	3,010	1,797	363	1,597	3,757
St. Francois	225	81	286	592	1,019	237	891	2,147	1,254	329	1,245	2,828
St. Louis	447	82	591	1,120	367	44	260	671	899	184	1,101	2,184

<sup>1</sup>Includes deer harvested during managed hunts.

**Table 15.** County deer harvest totals by method of take and deer type, 2021.

	Archery				Firearms				Totals <sup>1</sup>			
County	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total	Antlered Bucks	Button Bucks	Does	Total
Ste. Genevieve	173	39	236	448	1,133	205	834	2,172	1,307	244	1,070	2,621
Saline	159	19	168	346	947	116	613	1,676	1,107	136	783	2,026
Schuyler	163	21	153	337	570	131	533	1,234	733	152	686	1,571
Scotland	294	51	242	587	869	199	841	1,909	1,163	250	1,084	2,497
Scott	52	9	98	159	295	50	190	535	347	59	289	695
Shannon	236	34	227	497	1,368	245	1,228	2,841	1,615	280	1,467	3,362
Shelby	256	31	241	528	885	174	823	1,882	1,141	205	1,064	2,410
Stoddard	228	71	292	591	700	168	666	1,534	939	240	971	2,150
Stone	202	21	184	407	732	107	560	1,399	936	128	744	1,808
Sullivan	297	21	244	562	1,116	113	694	1,923	1,414	134	938	2,486
Taney	219	46	228	493	864	166	690	1,720	1,083	212	919	2,214
Texas	324	69	347	740	2,308	473	1,959	4,740	2,634	542	2,306	5,482
Vernon	313	46	309	668	1,250	171	839	2,260	1,580	228	1,170	2,978
Warren	305	40	267	612	1,096	189	796	2,081	1,401	229	1,064	2,694
Washington	254	93	315	662	1,372	364	1,170	2,906	1,626	457	1,486	3,569
Wayne	313	97	378	788	1,287	217	743	2,247	1,606	315	1,132	3,053
Webster	267	44	253	564	1,261	235	1,057	2,553	1,528	279	1,310	3,117
Worth	190	10	146	346	477	55	292	824	667	65	438	1,170
Wright	262	60	305	627	1,521	296	1,177	2,994	1,783	357	1,483	3,623
Regional												
Central	3,817	791	4,276	8,884	17,047	3,761	16,724	37,532	20,890	4,593	21,151	46,634
Kansas City	3,016	543	3,182	6,741	12,433	2,046	9,539	24,018	15,598	2,672	13,057	31,327
Northeast	4,076	557	3,778	8,411	14,933	2,889	13,188	31,010	19,019	3,455	16,990	39,464
Northwest	3,346	311	2,726	6,383	14,868	1,715	9,444	26,027	18,243	2,040	12,230	32,513
Ozark	2,924	715	3,425	7,064	16,384	3,491	14,850	34,725	19,373	4,234	18,352	41,959
Southeast	2,318	678	3,052	6,048	12,331	2,494	9,846	24,671	14,683	3,187	13,004	30,874
Southwest	4,155	687	3,824	8,666	17,700	2,756	12,793	33,249	21,916	3,475	16,760	42,151
St. Louis	2,992	728	3,581	7,301	10,883	2,250	8,960	22,093	14,093	3,094	13,034	30,221
Statewide												
<b>Totals</b>	<b>26,644</b>	<b>5,010</b>	<b>27,844</b>	<b>59,498</b>	<b>116,579</b>	<b>21,402</b>	<b>95,344</b>	<b>233,325</b>	<b>143,815</b>	<b>26,750</b>	<b>124,578</b>	<b>295,143</b>

<sup>1</sup>Includes deer harvested during managed hunts.

# Deer Management on Private Lands – Impacts of Hunting on Deer Movement

White-tailed deer are incredibly perceptive animals, capable of assessing their surroundings to understand their risk of danger at a given moment and responding accordingly. In suburban areas supporting deer populations, deer often become habituated to the presence of people and cars, and seem to pay little mind as if they know they won't be bothered. Similarly, during summer months deer can be seen lazily browsing their way across an open crop field during broad daylight. Yet, as soon as deer season rolls around in the fall, those same deer seem to sense the danger and immediately shift their behavior. A question that has been asked over and over again by many a disgruntled hunter is, "Where have all the deer gone?"

The advent of GPS technology and its use in wildlife research in recent years has helped to shed some light on this question. Here, we explore just a few recent studies that demonstrate how deer respond to the presence of hunters. One study used GPS collars to monitor behavior of female whitetails in response to hunting within a longleaf pine forest in South Carolina. On this property, hunters were dropped off and picked up from fixed hunting stands and researchers wanted to determine if deer would respond to these "danger zones" by decreasing movement around them, and if the amount of time since a stand was last hunted had any effect on use of these areas by deer. They found that deer did, in fact, reduce their use of danger zones during the middle of the day, and increased movement in these areas at night, immediately following a stand being hunted. Not surprisingly, mid-day movement increased within danger zones each 24-hour period that passed since a stand was hunted. For stands that were hunted multiple times, the increase in use of those areas by deer after the last hunt was more gradual. These findings indicate that deer are capable of accurately identifying localized areas of risk, such as the area surrounding a fixed hunting stand, and avoiding those areas after even a single hunt. However, as time passes, deer eventually return to normal movement patterns, although stands hunted more often require more time to pass before deer resume use of those areas.

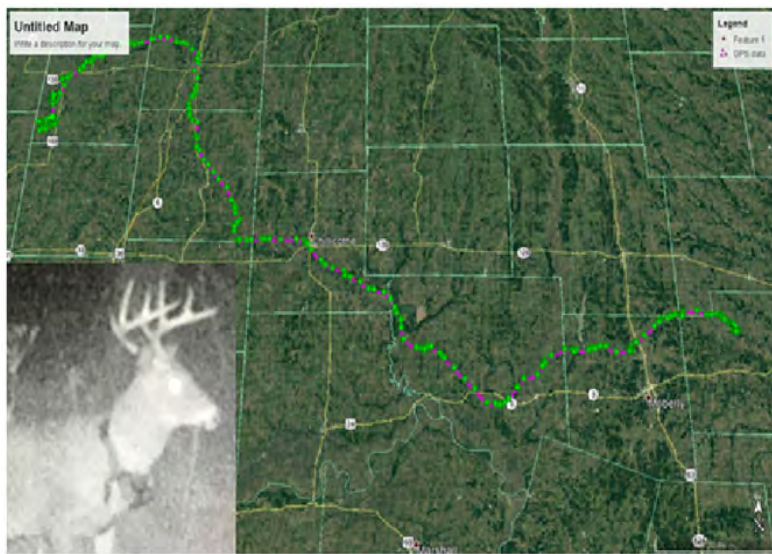


**Figure 15.** A GPS-collared female deer in Missouri.

Another study utilized GPS collars to monitor movements of male and female white-tailed deer across 4 locations in Alabama, including both public and privately owned property. Across these study areas, hunters tended to spend the majority of their time afield during weekends (Fri-Sun), with much less hunting activity during the remainder of the week (Mon-Thurs). The researchers were interested in seeing if deer could perceive this pattern of risk throughout the week and alter their behavior accordingly. As might be expected, researchers observed a decrease in daytime deer movement over the course of the weekends. In fact, by Sundays, deer were 24% less likely to be active during the day compared to Fridays when hunters first arrived. However, nighttime deer movements were similar for each day of the week, indicating deer can perceive the risky and safe times to be active and alter their behavior accordingly. Interestingly, daytime deer movement remained suppressed for 2 additional days following the heavy hunting pressure on weekends, and it wasn't until Wednesdays that movement returned to normal. This suggests that deer may be able to pattern hunters and predict when they will be in the field based on past experiences.



In both of the previously mentioned studies, deer altered their movement in space and time to reduce the chances of encountering hunters. Both studies demonstrated the acute awareness that white-tailed deer possess of their surroundings and how they can use their powerful perceptive abilities to foil hunters. However, both studies also reveal something about human hunters that deer are able to capitalize on to do so. Namely, that humans are often creatures of habit; hunting from the same stands at the same times on the same days of the week. This can make it all too easy for deer, which make a living out of avoiding predators, to go unseen by hunters. Many times when hunters aren't seeing as many deer as they expect, they tend to think the deer have moved off of their property and aren't available for harvest. But, these studies suggest that deer generally reduce their movement in response to hunting pressure, and may make a slight shift in their location, but remain in the area throughout hunting season. This strategy makes sense because it requires less energy from the deer compared to a flight response or long-distance movement, and keeps the deer in familiar territory allowing the animal to return to normal behavior as soon as the coast is clear. This is good news for hunters because it suggests that the deer they are after are still around and theoretically available if they make a mistake. The research suggests that chances of seeing deer while hunting can be increased by being less predictable by varying hunting locations from one hunt to the next rather than returning to the same stand time after time. The research also suggests that allowing a day or two between hunts may also limit the ability of deer to predict when hunters will be in the woods and any impacts hunting may have on deer movement.



**Figure 16.** A trail camera image and movement path of an adult male deer that traveled 186 miles across northern Missouri in 2017.

Research also suggests that there is some degree of individuality expressed in deer behavior. While deer of the same sex and age may, on average, behave a certain way under a similar set of circumstances, there will always be outliers that do something different. Case in point was a male deer in northwestern Missouri that was fitted with a GPS collar when he was estimated to be 2.5-years-old. Although most male deer disperse at roughly 12-18 months of age, this deer dispersed from the home range he was captured in roughly a year later at 3.5-years-old. Furthermore, this dispersal was the longest movement ever recorded of a white-tailed deer, covering 186 miles over a span of 22 days beginning November 4 and ending November 25. Though the exact reason for this deer's extreme movement is unknown, the dispersal period includes the peak of the breeding season for white-tailed deer in Missouri, as well as the period of highest-intensity hunting pressure, so either of those factors are likely to have played a role in this behavior. If this buck had been on a landowner's trail cameras and list of targets prior to deer

season, he was nowhere to be found on that property by the time opening day rolled around. We know, based on hundreds of other deer that were also wearing GPS collars during this same study, that long-distance movements such as this are the exception, rather than the rule, when it comes to deer response to hunting pressure. However, it's important to recognize that no matter how careful we are as hunters, or how well we think we understand deer behavior and what they are going to do, there are always factors beyond our control which will forever make white-tailed deer a worthy adversary.

**For more information related to any of the studies summarized here, see the full-length articles:**

Sullivan, J. D., S. S. Ditchkoff, B. A. Collier, C. R. Ruth, and J. B. Raglin. 2018. Recognizing the danger zone: response of female white-tailed to discrete hunting events. *Wildlife Biology* <https://doi.org/10.2981/wlb.00455>.

Wiskirchen, K. H., T. C. Jacobsen, S. S. Ditchkoff, S. Demarais, and R. A. Gitzen. 2022. Behaviour of a large ungulate reflects temporal patterns of predation risk. *Wildlife Research* <https://doi.org/10.1071/WR21047>.

Moll, R. J., J. T. McRoberts, J. J. Millsaugh, K. H. Wiskirchen, J. A. Sumners, J. L. Isabelle, B. J. Keller, and R. A. Montgomery. 2020. A rare 300 kilometer dispersal by an adult male white-tailed deer. *Ecology and Evolution* <https://doi.org/10.1002/ece3.7354>.

# Deer Research Projects

## Southeast Deer Cropland Study

A 3-year study began during 2016 in southeast Missouri to better understand deer movement ecology related to small soybean fields. To help us understand deer movement, MDC captured and fitted deer with GPS collars during the summer months from 2016-2018. A total of 76 adult does were collared. The GPS collars will help us understand how deer utilize the landscape and help to inform landowners and hunters about deer movements and target efforts to reduce deer densities, especially where deer are causing crop damage. The remainder of the collars were remotely removed from deer in May 2020 concluding the tracking portion of the study. Analysis is ongoing and final results will be made available to the public as they become available.

Crop damage assessments, crop damage manipulation, and crop planting timing are being investigated in addition to the collaring efforts. We know that the timing of the plant damage can impact yields in different ways, even leading to increases in yield in some cases. There may also be a correlation in the amount of damage and its impact on yield based on when the crop was planted during the growing season.

Our goal is to provide that information to farmers as another way to understand and possibly minimize the impacts of deer damage on crop yield. Data collection efforts related to crop damage assessments, crop planting timing, and crop damage manipulation have concluded. Analyses are underway and final results and any management recommendations will be shared with the public and area landowners once complete.



**Figure 17.** Crop damage assessments being conducted in a soybean field in 2017 to evaluate yield differences between protected and unprotected plants.

## Survival, Recruitment, and Movement Patterns of White-tailed Deer in Missouri

This was a 5-year study (2015-2019) designed to determine reproduction and survival rates, as well as examine movement patterns of white-tailed deer in 2 contrasting Missouri landscapes: the glaciated plains of northern Missouri and the Ozarks of southern Missouri. Field work and data collection efforts have completed, but researchers continue to analyze these data and provide new findings as they become available.

A paper using data from this project was recently published, which looked at female white-tailed deer movement and habitat use around the timing of parturition (fawning). These data came from 127 pregnant females that were fitted with GPS collars and monitored before, during, and after parturition. Females in the glaciated plains consistently selected for forested habitats and areas enrolled in the Conservation Reserve Program (CRP) over other available habitat types including crops, grasslands, and wetlands. In the Ozarks, females consistently selected for deciduous forests and grasslands. Significant

changes in preferred habitat before, during, or after parturition did not occur in either region, although females shifted movements to favor south-facing slopes within these habitat types during the week of parturition, likely to assist in neonate thermoregulation. Females in both regions also preferred locations close to forest edges, which likely consisted of higher plant diversity and higher-quality forage as well as denser cover for fawns compared to habitat interiors. Consistent habitat use around the time of parturition suggests that selected areas are important habitat types in each region, providing adequate fawning cover and sufficient nutrients to support lactation. Selection for CRP in the glaciated plains over other habitat types, including other grasslands, is an important finding considering land enrolled in CRP has declined nationally by more than 35% since its peak in 2007. Efforts to increase CRP enrollment or to manage habitat in a similar fashion would appear to be beneficial for white-tailed deer reproduction, especially where forest availability is limited.



**Figure 18.** A white-tailed deer fawn in Missouri.

# Deer Management Assistance Program (DMAP)

In 2021, the Missouri Department of Conservation completed its third year of offering landowners the opportunity to enroll in the Deer Management Assistance Program (DMAP). The program is designed to enable landowners to meet deer management goals on their property through additional antlerless deer harvest opportunities during deer season. Deer management objectives of those seeking to enroll in DMAP generally fall within 1 of 2 categories: 1) to reduce damage caused by deer browsing on agricultural, forest, or other plant communities, or 2) to achieve recreational deer management goals. To continue improving program effectiveness, enrolled landowners participate in a yearly post-season survey. Following the 2021 deer season, when participants were asked on a scale of 1–10 whether they would recommend DMAP to a friend or colleague, 90% responded with an 8 or higher and 98% of respondents agreed that DMAP is an effective program for managing deer populations. Many suggestions were also provided through the survey on ways to improve the program, such as streamlining the application process.

Given the continued success of DMAP, the program has been expanded statewide for the 2022 deer season. DMAP currently requires a minimum of 500 acres to enroll in rural areas and at least 40 acres within municipalities. Individual parcels of land, regardless of ownership, may be combined to satisfy the acreage requirement. However, each land parcel must be within ½ mile (by air) of the boundary of another parcel being combined to form an enrolled DMAP property. Additionally, landowners will be asked to collect deer population data prior to enrollment to help inform the number of DMAP Permits that will be available. This can be a camera survey, observation data, or other information that provides an estimate of deer abundance on the property.

The annual DMAP enrollment period extends from May 15 through October 1. All properties, including those that have been previously enrolled, must be enrolled annually.

For more program or enrollment information, visit [mdc.mo.gov/dmap](https://mdc.mo.gov/dmap) or contact the Private Lands Deer Biologist at [Kevyn.Wiskirchen@mdc.mo.gov](mailto:Kevyn.Wiskirchen@mdc.mo.gov) or (573) 815-7901 ext. 2899

**Table 16.** Comparison of 2019, 2020, and 2021 Missouri Deer Management Assistance Program (DMAP) enrollment and harvest data.

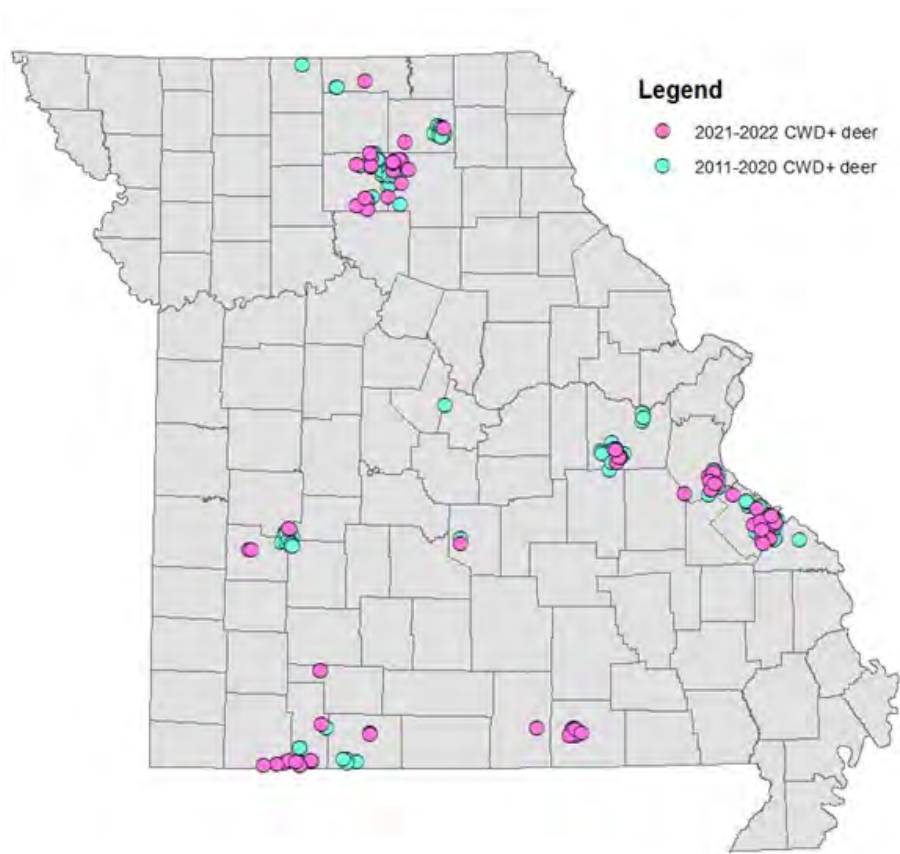
	2019	2020	2021
<b>Eligible Counties</b>	7	41	89
<b>Enrolled Properties</b>	13	28	56
<b>Enrolled Landowners</b>	23	45	89
<b>Enrolled Acreage</b>	11,496	36,788	86,182
<b>Authorized Permits/Hunters</b>	311/89	587/147	1,583/338
<b>Filled Permits</b>	96 (31%)	366 (62%)	613 (39%)



# Chronic Wasting Disease Overview

Chronic wasting disease (CWD) is a contagious, always fatal disease of deer, elk, and other members of the deer family. It spreads by direct animal-to-animal contact, through urine, saliva, feces, and carcass parts of infected animals, and by animal contact with contaminated soil, water, or plant material. There is no known cure, treatment, or vaccine for CWD. Over time, CWD can spread widely and infect a large percentage of a deer population. When CWD becomes widely established, survival rates decrease, and population impacts are expected. The best way to manage CWD is to prevent its introduction into new areas and limit its spread.

Routine, statewide CWD surveillance began in Missouri in 2002. Since that time, over 210,000 deer have been tested for CWD. The disease was first detected in confined deer in Linn County in 2010, in confined deer in Macon County in 2011, and in free-ranging deer in Macon County in 2012. As of May 2022, CWD has been detected in a total of 292 free-ranging deer in 22 counties (**Figure 19**). While the continued spread of CWD into new areas of Missouri is concerning, the percent of CWD-positive deer where CWD has been found remains low, and CWD remains relatively rare in the state.



**Figure 19.** CWD-positive free-ranging detections through May 2022.

County	Year of 1st Detection	Total CWD+ To Date
Adair	2014	23
Barry	2021	4
Cedar	2017	3
Christian	2021	2
Cole	2014	1
Crawford	2018	1
Franklin	2015	30
Howell	2021	1
Jefferson	2016	21
Linn	2015	37
Macon	2012	57
Mercer	2018	1
Oregon	2018	16
Perry	2017	5
Polk	2017	8
St. Clair	2016	10
Ste. Gen.	2017	50
Stone	2018	10
Taney	2018	6
Pulaski	2020	2
Putnam	2020	3
Washington	2021	1
Total		292

## CWD and Human Health

There have been no known cases of CWD infection in humans, but research is ongoing and potential risks are unknown at this time. The Centers for Disease Control and Prevention (CDC) recommends that hunters have their deer tested before consuming it if hunting in an area where CWD has been found. The CDC also recommends not consuming meat from known CWD-positive animals. For more information, visit <https://www.cdc.gov/prions/cwd/index.html>.

## 2021 CWD Surveillance and Monitoring

More than 32,000 free-ranging deer were tested for CWD across Missouri during the 2021-2022 CWD surveillance year (July 1, 2021 - June 30, 2022). Over 18,700 deer were tested during mandatory sampling within the CWD Management Zone on opening weekend of the November portion. Partnering taxidermists and meat processors collected the majority of the remaining samples. Taxidermists and meat processors play a critical role in Missouri's CWD surveillance efforts. Over 120 sick deer were also tested during the 2021-2022 surveillance year of which none tested positive for CWD.

Of the deer tested for CWD during the 2021-2022 CWD surveillance year, 86 deer tested positive in the following 18 counties: Adair (2), Barry (4), Cedar (2), Christian (2), Franklin (6), Howell (1), Jefferson (12), Linn (12), Macon (10), Oregon (6), Perry (2), Pulaski (1), Putnam (1), St. Clair (1), Ste. Genevieve (15), Stone (6), Taney (2), and Washington (1). CWD detections in Barry, Christian, Howell, and Washington counties were the first detections to date in each of these counties. The 86 CWD-positive deer included 54 hunter-harvested and 32 removed during post-season targeted removals.

## CWD Regulations Update

Regulations aimed to slow CWD spread were implemented within CWD Management Zone counties. The CWD Management Zone includes counties within 10-miles of CWD detections. For 2021-2022, the CWD Management Zone included 34 counties (**Figure 20**). Regulations include a ban on feeding and minerals, mandatory sampling requirements (select counties), removal of the antler-point restriction, and an increase in antlerless deer harvest opportunities designed to prevent population growth.



**Figure 20. 2021 CWD Management Zone.**

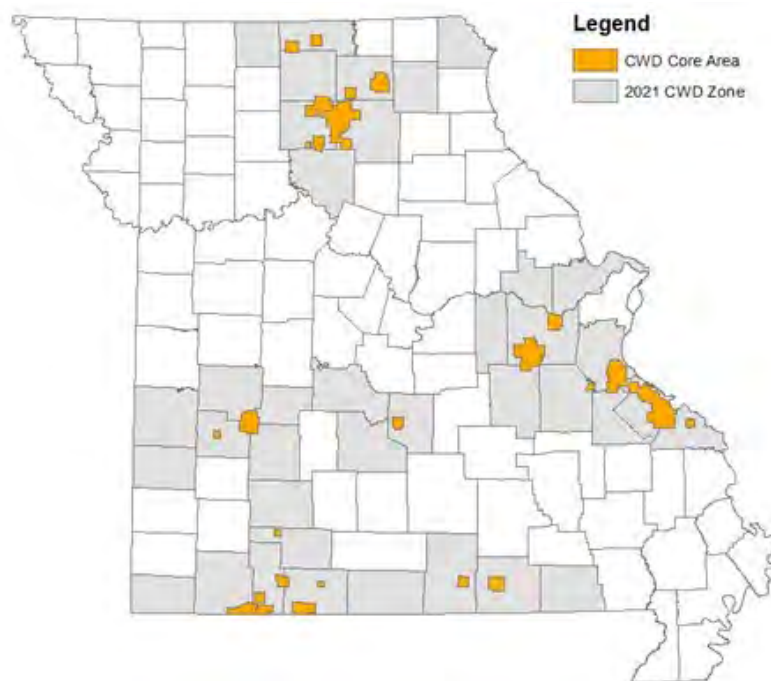
## CWD Management Permits and Targeted Removals

CWD Core Areas are designated in localized areas where CWD is detected (**Figure 21**). CWD Core Areas include each section/land grant where a CWD detection occurs along with a 2-section buffer. Increasing deer harvest in CWD Core Areas can slow transmission rates and limit the level of CWD in the environment by lowering deer densities and removing infected deer.

To increase harvest in CWD Core Areas, qualifying landowners are offered CWD Management Permits, allowing for harvest of deer of either sex during the deer season. During the 2021-2022 deer season, 1,052 deer were Telechecked on CWD Management Permits.

From January 16th through March 15th, MDC staff worked closely with cooperating landowners to remove additional deer within CWD Core Areas. Post-season targeted removals are one of the only known methods to directly slow CWD growth in areas where CWD is not widely established and provide a unique opportunity to monitor reproductive rates of deer populations in these areas (**Table 17**). This information helps MDC better understand the timing of the rut and fawning across the state, as well as the overall health of the deer population. Together, MDC staff and landowners removed 3,072 deer within CWD Core Areas during targeted removal in 2022. Thirty-two of the deer tested positive for CWD. Meat from deer in which CWD was not detected was returned to landowners or donated to the Share the Harvest venison donation program.





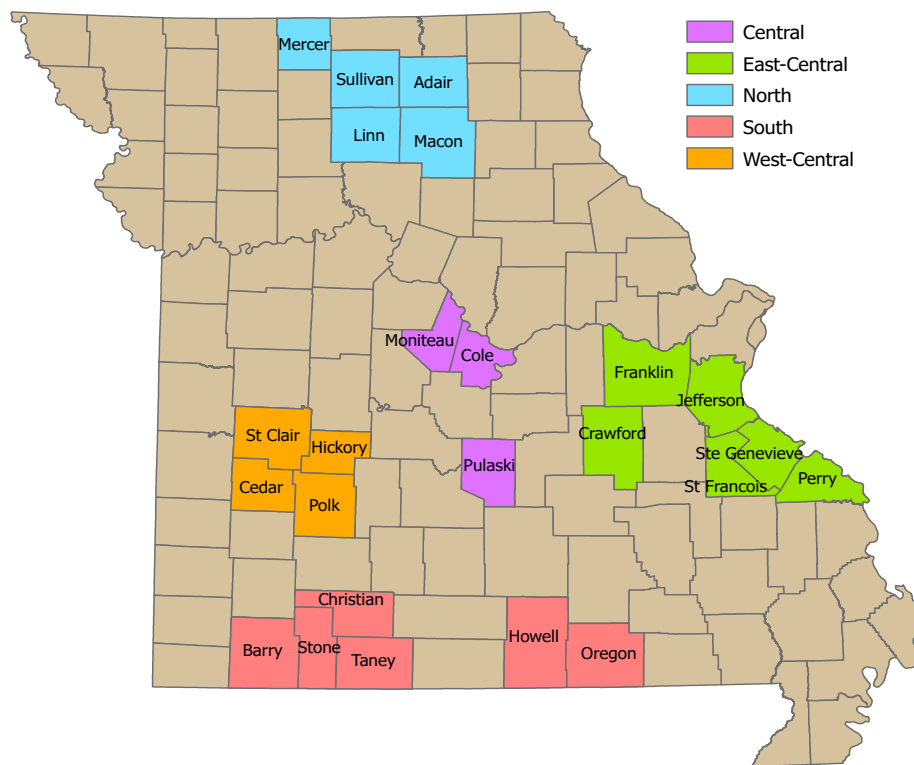
**Figure 21.** CWD Core Areas in Missouri, 2021.

**Table 17.** Reproductive data collected during post-season targeted removal operations in CWD Core Areas, 2017-2022.

Region <sup>1</sup>	Female Age	n <sup>2</sup>	Average Conception Date	Average Parturition Date	Pregnancy Rate	Fetuses per Pregnant Female	Fetal Sex Ratio (M:F)
South	0.5	69	14-Nov	31-May	0.07	1.40	0.33
	1.5	61	8-Nov	25-May	0.57	1.20	1.31
	2.5+	432	6-Nov	23-May	0.91	1.76	1.00
	All	562	6-Nov	23-May	0.77	1.71	1.03
Central	0.5	3	NA	NA	NA	NA	NA
	1.5	5	NA	NA	NA	NA	NA
	2.5+	115	8-Nov	25-May	0.93	1.93	1.19
	All	123	8-Nov	25-May	0.89	1.92	1.21
East-Central	0.5	103	3-Dec	19-Jun	0.13	1.23	2.25
	1.5	106	17-Nov	2-Jun	0.88	1.58	1.23
	2.5+	554	13-Nov	31-May	0.92	1.85	1.22
	All	764	14-Nov	1-Jun	0.80	1.80	1.24
North	0.5	259	24-Nov	10-Jun	0.04	1.27	1.00
	1.5	188	8-Nov	28-May	0.90	1.69	0.91
	2.5+	1046	10-Nov	28-May	0.96	1.98	1.14
	All	1496	10-Nov	28-May	0.79	1.93	1.11
West-Central	0.5	128	29-Nov	15-Jun	0.03	1.25	1.50
	1.5	85	5-Nov	31-May	0.91	1.55	0.84
	2.5+	449	9-Nov	28-May	0.97	1.87	1.20
	All	663	9-Nov	29-May	0.78	1.82	1.14
Statewide	0.5	562	28-Nov	14-Jun	0.06	1.27	1.25
	1.5	445	13-Nov	30-May	0.84	1.58	0.99
	2.5+	2596	11-Nov	28-May	0.94	1.90	1.15
	All	3608	11-Nov	28-May	0.79	1.85	1.13

<sup>1</sup>Refer to Figure 22 for regional designations.

<sup>2</sup>Indicates number of deer.



**Figure 22.** Regional designations for deer reproduction data collected post-season (see Table 17).

## CWD Research Projects

### Identifying and Understanding Landowner Motivations and Barriers to Participating in the CWD Targeted Removal Program

This ongoing research project has two objectives: 1) Identify and assess the barriers and motivations that drive landowner participation in targeted removals, and 2) Gain information to help design a program to recruit landowners and to retain their participation in targeted removals. During the project, MDC collaborated with DJ Case & Associates to conduct 12 focus group meetings with landowners in a subset of CWD Core Areas. Information obtained from the focus group meetings will be used to design a survey that will be mailed to landowners in CWD Core Areas to quantitatively assess landowner opinions of targeted removals and to gain a greater understanding of their opinions about CWD and CWD management.

### Modeling the Effects and Risks of Common Harvest Strategies and Human Practices to Promote Effective Management of CWD

This ongoing research project is a collaborative effort between MDC and researchers at Emory University in Georgia and the University of Montana. Objectives of the project are to: 1) Evaluate the effects of targeted removals on CWD prevalence rates, 2) Evaluate factors that would result in maximum effectiveness of the targeted removal strategy, 3) Identify trigger points to guide targeted removal efforts to help allocate limited resources where they are likely to be most successful, and 4) Identify alternative harvest strategies to implement when targeted removal efforts are no longer likely to be successful due to high CWD prevalence rates or extensive disease spread. Results from the project will be used to prioritize future targeted removal efforts and to determine when removal efforts should cease in an area based on the evaluated factors. Project results will also help to determine how MDC's disease surveillance approach should change based on thresholds of prevalence rates and spatial distribution.



Missouri Department of Conservation